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| APPLICATION NO.                 | FILING DATE    | FIRST NAMED INVENTOR     | ATTORNEY DOCKET NO.     | CONFIRMATION NO. |
|---------------------------------|----------------|--------------------------|-------------------------|------------------|
| 09/746,174                      | 12/21/2000     | Christopher S. MacLellan | EMC2-085PUS             | 2915             |
| 45456 7                         | 590 04/06/2005 |                          | EXAMINER                |                  |
| RICHARD M. SHARKANSKY           |                |                          | BAKER, STEPHEN M        |                  |
| PO BOX 557<br>MASHPEE, MA 02649 |                |                          | ART UNIT                | PAPER NUMBER     |
|                                 |                |                          | 2133                    |                  |
|                                 |                |                          | DATE MAILED: 04/06/2005 |                  |

Please find below and/or attached an Office communication concerning this application or proceeding.

|                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Application No.                                                                                                                                                                                   | Applicant(s)                                                                                         |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|--|--|--|
| Office Action Summary                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 09/746,174                                                                                                                                                                                        | MACLELLAN, CHRISTOPHER S.                                                                            |  |  |  |
|                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Examiner                                                                                                                                                                                          | Art Unit                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Stephen M. Baker                                                                                                                                                                                  | 2133                                                                                                 |  |  |  |
| Period fo                                                                                                                                                                                                                                                                                           | The MAILING DATE of this communication ap<br>or Reply                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | pears on the cover sheet with the c                                                                                                                                                               | orrespondence address                                                                                |  |  |  |
| THE - Exte after - If the - If NC - Failu Any                                                                                                                                                                                                                                                       | ORTENED STATUTORY PERIOD FOR REPL MAILING DATE OF THIS COMMUNICATION. nsions of time may be available under the provisions of 37 CFR 1. SIX (6) MONTHS from the mailing date of this communication. e period for reply specified above is less than thirty (30) days, a reply period for reply is specified above, the maximum statutory period in the toreply within the set or extended period for reply will, by statut reply received by the Office later than three months after the mailing ed patent term adjustment. See 37 CFR 1.704(b). | 136(a). In no event, however, may a reply be timely within the statutory minimum of thirty (30) days will apply and will expire SIX (6) MONTHS from the cause the application to become ABANDONE! | nely filed s will be considered timely. the mailing date of this communication. D (35 U.S.C. § 133). |  |  |  |
| Status                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                   |                                                                                                      |  |  |  |
| 1)⊠                                                                                                                                                                                                                                                                                                 | Responsive to communication(s) filed on 03 N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | November 2004.                                                                                                                                                                                    |                                                                                                      |  |  |  |
|                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | s action is non-final.                                                                                                                                                                            |                                                                                                      |  |  |  |
| 3)[                                                                                                                                                                                                                                                                                                 | <b>-</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                   |                                                                                                      |  |  |  |
| Dispositi                                                                                                                                                                                                                                                                                           | ion of Claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                   |                                                                                                      |  |  |  |
| 4)  Claim(s) 1-7 is/are pending in the application. 4a) Of the above claim(s) is/are withdrawn from consideration.  5)  Claim(s) 6 and 7 is/are allowed.  6)  Claim(s) 1-5 is/are rejected.  7)  Claim(s) is/are objected to.  8)  Claim(s) are subject to restriction and/or election requirement. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                   |                                                                                                      |  |  |  |
| Applicati                                                                                                                                                                                                                                                                                           | ion Papers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                   |                                                                                                      |  |  |  |
| 9)[                                                                                                                                                                                                                                                                                                 | The specification is objected to by the Examina                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | er.                                                                                                                                                                                               |                                                                                                      |  |  |  |
| 10)[                                                                                                                                                                                                                                                                                                | 10) The drawing(s) filed on is/are: a) accepted or b) objected to by the Examiner.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                   |                                                                                                      |  |  |  |
|                                                                                                                                                                                                                                                                                                     | Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                   |                                                                                                      |  |  |  |
| Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                   |                                                                                                      |  |  |  |
| Priority ι                                                                                                                                                                                                                                                                                          | under 35 U.S.C. § 119                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                   |                                                                                                      |  |  |  |
| 12) [<br>a)                                                                                                                                                                                                                                                                                         | Acknowledgment is made of a claim for foreign All b) Some * c) None of:  1. Certified copies of the priority documen 2. Certified copies of the priority documen 3. Copies of the certified copies of the priority documen application from the International Burea See the attached detailed Office action for a list                                                                                                                                                                                                                            | ts have been received. ts have been received in Applicationity documents have been received in (PCT Rule 17.2(a)).                                                                                | on No<br>ed in this National Stage                                                                   |  |  |  |
| A44                                                                                                                                                                                                                                                                                                 | Ma)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                   |                                                                                                      |  |  |  |
| Attachment(s)  1) Notice of References Cited (PTO-892)  4) Interview Summary (PTO-413)                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                   |                                                                                                      |  |  |  |
| 2)                                                                                                                                                                                                                                                                                                  | e of Draftsperson's Patent Drawing Review (PTO-948) mation Disclosure Statement(s) (PTO-1449 or PTO/SB/08) r No(s)/Mail Date                                                                                                                                                                                                                                                                                                                                                                                                                      | Paper No(s)/Mail Da                                                                                                                                                                               |                                                                                                      |  |  |  |

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#### **DETAILED ACTION**

# Claim Rejections - 35 USC § 103

- 1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
- 2. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,559,506 to Leitch *et al* (hereafter "Leitch") in view of U.S. Patent No. 4,682,328 to Ramsay *et al* (hereafter "Ramsay") and the published article "A Tutorial on CRC Computations" written by Ramabadran *et al* (hereafter "Ramabadran").

Leitch discloses protecting transmitted data bits by generating single vertical parity and single horizontal parity for every row and column of the data while the data is arranged in an  $R \times Q$  bit array, transmitting the bits of the  $(R+1)\times(Q+1)$  2-Dimensional parity block code in column order, interleaved between tiers of other 2-D parity block codes. Leitch further discloses validating/correcting the transmitted data upon reception by a process including checking the vertical and horizontal parities.

Leitch does not refer to the process of checking vertical and horizontal parity as one involving "comparing" received parity with re-generated parity. Ramsay provides an example of conventional parity checking, by comparing received parity with regenerated parity. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to implement Leitch's horizontal and vertical parity checking by comparing each received parity bit with a corresponding re-generated

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parity bit, because performing parity checking by comparing a received parity bit with a re-generated parity bit is conventional, as evidenced by Ramsay.

Although Leitch does not specifically show an embodiment with R=8 or Q=8, Leitch teaches no limit on R and Q other than that they both are positive integers.

Additionally, the term "byte" has been known to be applied to groups of 4 bits. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to choose R or Q = 8 (assuming a "byte" refers to 8 bits) in Leitch's system, because Leitch places no limit on the size of R and Q, and because 8-bit data units are a standard convenient size.

Leitch does not refer to the parity row as a "CRC". Ramabadran discloses that vertical parity (LRCC) is, in mathematical terms, a CRC, as it has a generator polynomial (x<sup>n</sup>+1), where "n" is the length of each row. Accordingly, Q bits of Leitch's vertical parity row are a CRC with a generator polynomial (x<sup>Q</sup>+1), and Leitch's vertical parity bit in the horizontal parity column is the "parity of the CRC". Leitch's vertical parity bit in the horizontal parity column (the Q+1-th bit in row R+1) is also, by definition, the parity bit of the R data row parities. Thus, in re-generating a vertical parity check bit on the horizontal parity bits in Leitch's system, Leitch's system would be "generating the parity of the parity bits of the plurality of bytes of data, such generated parity being the parity of the CRC of such data".

In re-generating a vertical parity check bit on the horizontal parity bits in Leitch's system with Q=8, Leitch's system would be "generating parity of the parity bits of the plurality of bytes". In comparing the received vertical parity check bit on the horizontal

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parity bits in Leitch's system to the re-generated vertical parity check bit on the horizontal parity bits in Leitch's system, Leitch's system with Q=8 would be "comparing such generated parity with the parity bit of the CRC of the data".

# Allowable Subject Matter

3. Claims 6 and 7 are allowed.

### Response to Arguments

4. Applicant's arguments filed 03 November 2004 have been fully considered but they are not persuasive.

Applicant's arguments have been carefully reviewed and appear to contradict the examiner's understanding and explanations of parity calculation and checking, as well as CRC calculation and checking. The rejections have been clarified to show that the grounds thereof can been seen to have a sound and demonstrated basis in the algebra of linear and cyclic codes.

#### Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen M. Baker whose telephone number is (703) 305-9681. The examiner can normally be reached on Monday-Friday (11:00 AM - 7:30 PM).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert DeCady can be reached on (703) 305-9595. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Stephen M. Baker Primary Examiner Art Unit 2133 Page 5

smb